

REMARKS

Applicant respectfully requests entry of the above amendment, favorable consideration of the below remarks, withdrawal of the rejections, and passage of the pending claims to allowance. Applicant wishes to thank the Examiner for the remarks in the Office Action mailed May 4, 2006 and during the telephone call of April 26, 2006. Applicant also wishes to acknowledge the Examiner's indication in Paragraph 4 of the Office Action that allowable subject matter is present in Claims 12, 18 and 19. Claims 1, 11, 12, 18, 41 and 42 have been amended to better encompass the scope of the invention. Support for these amendments can be found with the Specification. No new matter has been added.

Rejection of Claims under 35 U.S.C. § 102

In paragraphs 1 and 2 of the Office Action, the Examiner rejected Claims 1-4, 10, 11, 15, 20 and 41 under 35 U.S.C. 102(b) as being anticipated by USPN 3130945 to De Seversky (hereinafter referred to as "'945"). Applicant respectfully traverses this rejection.

In the art of rocket propulsion and the related fields of astrodynamics and orbital mechanics (concerned with motions of bodies in space and subjected almost exclusively to gravitational forces), the term "free trajectory" refers to motion of a body (planet, moon, etc.) or vehicle (spacecraft) that is not constrained by being captured by the presence of a given gravitational field to the extent that it will orbit the body (or bodies) producing said gravitational field.

In contrast, high altitude flight as used in the context and intent of the '945 patent, is constrained to be within the denser parts of the atmosphere surrounding the Earth as referred in

the ‘945 patent at col 1 line 9, “[t]he invention relates to improved heavier-than-air aircraft, and more specifically to structures which are capable of either hovering or moving”. Major De Seversky of the ‘945 patent, was acknowledged in an article as being concerned that the “Ionocraft” of the ‘945 patent, might be mistaken for a kind of spacecraft (Blaze Labs Electro Hydro Dynamics Thrusters Research www.blazelabs.com/1-intro.asp). The renowned major is quoted as explaining emphatically, “[t]his is not a spacecraft,” to avert any potential misinterpretation. “It’s an airplane, designed to operate within the atmosphere.” Even further, the ‘945 patent refers to use of a gas turbine, thereby constraining operation to the lower parts of the Earth’s atmosphere where there is sufficient air density for air-fuel combustion and gas turbine operation. Additional terms within the ‘945 patent such as “lift force”, “airborne”, “producing desired lift”, “hovering flight”, and “aircraft”, point specifically to aerodynamic flight where lift force is required to maintain the craft in flight, and are not terms used in describing either free trajectories or orbital flight. Therefore, the term “orbit” is not applicable to the ‘945 patent.

The term “free trajectory” used by those skilled in the art is completely the opposite of “hovering”. Any craft that would be considered orbiting the Earth within its sensible atmosphere would need to be traveling between 7 and 8 km/sec (15,600 to 17,900 mph). The disclosure, drawings and claims of the ‘945 patent clearly demonstrate that such velocities were not anticipated.

Put even more simplistically, without the lift force provided to a vehicle as claimed in the ‘945 patent, the vehicle would rapidly descend to the Earth’s surface. In contrast, without the propulsive force of the ambient atmosphere ion thruster (hereinafter referred to as “AAIT”) of the

present invention, the craft, whether orbiting or on a free trajectory, would tend to remain above the Earth's surface for years to hundreds of thousands of years without the need for lift force. Based upon the aforementioned reasons and further detailed explanations, the '945 patent cannot anticipate Applicant's invention.

Applicant has herein amended Claim 1 to add that in the present invention, no lift force is applied to the craft. Applicant believes that the added text is consistent within the claims to clearly declare the purpose of elements of the invention and to facilitate understanding of the presently claimed invention.

Amended Claim 1 now recites:

1. An ambient atmosphere ion thruster system for propelling a craft, said system comprising

at least one ambient atmosphere ion thruster,
the at least one ambient atmosphere ion thruster comprising at least one pair of permeable electrical members, the at least one pair of permeable electrical members comprising a forward permeable electrical member for receiving ambient atmosphere reaction mass and an aft permeable electrical member, the forward permeable electrical member and the aft permeable electrical member, each having an opposing polarity in relation to one another, for accelerating a plurality of ambient atmosphere reaction mass ions,
the at least one ambient atmosphere ion thruster being mounted to the craft for imparting reaction force thereto, said craft having no on-board supply of reaction mass and no lift force applied thereto, and
at least one reaction force being imparted to the craft by accelerating the plurality of ambient atmosphere ions.

The Examiner in paragraph 2(a), has rejected Claim 1, stating that the '945 patent discloses an ion thruster craft, wherein the thruster is a pair of electrical members with opposite polarity,

and “[t]he craft also having no on board supply of reaction mass and accelerating ambient atmosphere ions.”

The configuration of the ‘945 patent is distinct and dissimilar to Applicant’s invention in regards to the relative configuration of the pair of electrical members having opposite polarity. The ‘945 patent discloses a configuration of emitting and collecting electrode wires that “take full advantage of all the ionized particles which are produced”, (col 5 line 1). As then disclosed in the ‘945 patent at col 12 line 10, the patent acknowledges that with their configuration, it makes “little difference whether the emitting wires are connected to the negative or to the positive terminal of the power supply”. However, in Applicant’s invention, the polarity of the paired grids is selected based on the positive or negative form of the ambient ions to be accelerated and the desired thrust direction, forward or reverse.

In Applicant’s novel invention, the naturally occurring ambient ions are swept into the electrically charged grids solely as a result of the craft’s inherent motion, the influx of ions then utilize a charged reactive mass that can provide useful thrust without the need to provide any additional ionization and without the need to provide reaction mass from propellant carried on-board the craft. Although the ‘945 patent neither shows nor suggests the use of on-board reaction mass for operation of the disclosed Ionocraft, it is clearly distinct from Applicant’s invention in that it specifies the continuous creation of ions from the naturally un-ionized atmosphere that exists in the vicinity of the craft, such ions being created in either positive or negative polarity by the choice of positive or negative voltage applied to the “emitter” wires of the ‘945 patent. The ‘945

patent teaches that it is only following the creation of the ions that the established electric field between emitter and grid creates from the motion of the mass flux through the device.

The definition used by the Examiner for the term “ambient” seems to refer to the species or constituents immediately external to the grid of wires or electrodes. Applicant’s use of the term “ambient”, in the context of “ambient atmosphere ions”, refers to the naturally existing ions that are in the atmosphere external to the AAIT grids or porous members and the craft to which it is attached. Given this distinction, the ‘945 patent does not disclose the acceleration of ambient ions that exist in the atmosphere.

The Examiner in paragraph 2(b), rejects Claim 2, by stating that the ‘945 patent discloses its device being connected to negative and positive terminals. As is standard in electronics, an electrical feed to a power source would be connected to negative and positive terminals in order to operate. The fact that the ‘945 patent also has these types of terminals is a misunderstanding of where the novelty of the invention lies. The innovation of Applicant’s invention lies in the theory of operation as recited in Claim 1 from which Claim 2 depends and the then further insulating support structure as described in Claim 2.

The Examiner in paragraph 2(c), rejects Claim 3, stating that the ‘945 patent discloses a device that takes an intake mass flux and puts out an exhaust mass flux. The Examiner fails to note that, in Applicant’s invention, influx of “ambient atmosphere ions” are specifically recited. The ‘945 patent merely refers to “air” or “atmosphere”, making no mention of the novel idea of using an influx of ambient ions in the atmosphere. Further, Applicant’s invention uses the preponderance of ionized atoms (i.e. monatomic oxygen, monatomic nitrogen and monatomic hydrogen) that exist

in the Earth's upper atmosphere or beyond. The '945 patent specifies the use of "air molecules" which primarily consist of diatomic molecules through which the aircraft is flying, and which are necessary for developing the lift force required for it to stay aloft. Again, the present invention is specifically designed for use in vehicles not requiring lift force to remain in operation.

The Examiner in paragraph 2(d), rejects Claim 4, remarking that the '945 patent discloses that two devices can be mounted on opposite sides of the craft. Applicant's novelty lies in the theory of operation of the system. The fact that the '945 patent uses dissimilar thrusters, in a similar arrangement, does not anticipate Applicant's invention.

The Examiner, in paragraph 2(e) rejects Claim 10, stating that the '945 patent discloses an ion thruster craft as seen at col 12 lines 11-16. In Applicant's Claim 10, by changing the electrical polarity of the charged grids with respect to the craft's velocity vector (direction of motion), the craft has the ability to provide either a positive acceleration (thrust in direction of motion) or a deceleration (thrust against the direction of motion) without having to reorient either the ambient atmosphere ion thruster or the craft. The '945 patent actually teaches away from this concept at col 12 line 10. The '945 patent states that "it makes little difference" what polarity is used between emitting and grid wires. The claimed improvement of 5% in the '945 patent with one polarity compared to the other is de facto contrary to the present invention since reversing the polarity of the charged grids in the AAIT will fully reverse the direction of the thrust. The '945 patent operation is based on the principle that if the emitting electrode is charged negatively relative to the grid then negatively charged molecular ions are created from the atmosphere (the air molecules pick up one or more electrons each) and these are accelerated toward the positively

charged grid to create a thrust. While on the other hand, if the emitting electrode is charged positive with respect to the grid, then positively charged ions are created from the atmosphere (the air molecules give up one or more electrons each) and these are accelerated to the negatively charged grid to create a thrust in the same direction.

In Applicant's invention, the direction of resulting thrust is directly dependent on whether the incoming ambient ion flux sees an accelerating electric field or a decelerating electric field. Consequently, although both the '945 patent and Applicant's invention claim use of electric fields to accelerate ions, the principles of operation are distinctly different. There is no disclosure in the '945 patent that reversing the polarity between the electrodes and grid will cause the charged air to accelerate in an opposite direction, specifically from the grid to emitting electrodes.

The Examiner in paragraph 2(f), rejects Claim 11, stating that the '945 patent discloses a free trajectory, in that, high altitude flight that is disclosed, is considered by the Examiner to be a free trajectory or orbit proximate to a body, in that, orbit is merely very high altitude flight. As explained within the above paragraphs herein, the elements of Claim 11 are not disclosed in the '945 patent. High altitude flight requires a sustaining lift force that is not required by free trajectory or orbital motion.

The Examiner in paragraph 2(g), rejects Claim 15, referring to the '945 patent figures 1-3. However, the distinctions of Applicant's invention are not disclosed in the '945 patent as described elsewhere in these remarks.

The Examiner in paragraph 2(h), rejects Claim 20, referring to the figures in the '945 patent. Once again, Applicant's invention is distinct and novel from the '945 patent as described

elsewhere in these remarks.

The Examiner in paragraph 2(i), rejects Claim 41, referring back to his arguments for the rejection of Claims 1 and 10. As stated in the response to the rejection in Claims 1 and 10, Applicant's invention is clearly not disclosed in the '945 patent. Applicant reasserts the arguments as stated above for Claims 1 and 10.

Claims 2-4, 10, 11, 15 and 20 depend from Claim 1, which Applicant respectfully asserts is allowable as amended. Applicant therefore believes that Claims 2-4, 10, 11, 15 and 20 are allowable by reason of their dependency from an allowable claim. Additionally Applicant believes said claims are allowable for the reasons as stated in the remarks articulated above. The Applicant respectfully requests that Claim 41 as amended, be allowed for the reasons expressed in the above paragraphs. Applicant respectfully requests entry of this amendment, favorable consideration of these remarks, withdrawal of these rejections and the passage to allowance of Claims 1-4, 10, 11, 15, 20 and 41.

Claim Objections

In paragraph 3 of the Office Action, the Examiner objected to Claim 42 as being in improper form. Accordingly, Claim 42 has been amended to the alternative form. Applicant respectfully requests entry of this amendment, favorable consideration and withdrawal of this rejection and the passage to allowance of amended Claim 42.

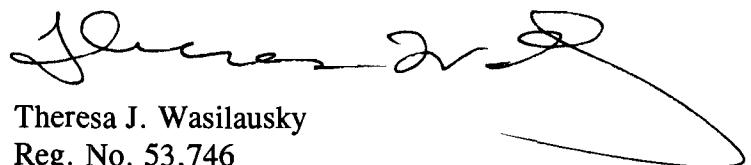
Allowable Subject Matter

In paragraph 4 of the Office Action, the Examiner objected to Claims 12, 18 and 19 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 12, 18 and 19 have been amended to include the limitations of the base claim and any intervening claims. Applicant respectfully requests, therefore, that the Examiner allow Claims 12, 18 and 19.

CONCLUSION

Applicant has herein traversed the rejections of the pending claims and respectfully requests withdrawal of the rejections of Claims 1-4, 10, 11, 15, 20 and 41. Applicant respectfully requests entry of the herein presented amendment to Claims 1, 11, 12, 18, 41 and 42, favorable consideration of the above remarks and allowance of the pending claims. The Examiner is cordially invited to telephone the undersigned for any reason, which would advance the pending claims to allowance.

Respectfully submitted,



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